

RIVER BEND STATION, CYCLE 5

CORE OPERATING LIMITS REPORT (COLR)

AUGUST 1992

PREPARED BY: PHU Y VO ^{PHU VO} DATE: 8/19/92
Sr. Nuclear Fuels Engineer

REVIEWED BY: John P. Egan ^{John P. Egan} DATE: 8/24/92
Sr. Nuclear Safety Engineer

REVIEWED BY: J. L. Johnson ^{KCW5124} DATE: 8/25/92
Supervisor,
Thermal/Hydraulic Analysis
River Bend Nuclear Station

APPROVED BY: G. A. DeLorenzo ^{#0021} DATE: 8/25/92
Supervisor, Core Analysis
River Bend Nuclear Station

APPROVED BY: J. S. Miller ^{J.S. Miller} DATE: 8/28/92
Director,
Engineering Analysis
River Bend Nuclear Station

APPROVED BY: J.R. Hamilton ^{/0032} DATE: 8/28/92
Manager, Engineering
River Bend Nuclear Station

APPROVED BY: S.R. Reddy ⁰¹⁸⁵ ^{MTG 92-114} DATE: 8/28/92
Facilities Review Committee
River Bend Nuclear Station

APPROVED BY: J. E. Beeson ²⁰²¹ ^{MTG 92-07} DATE: 8/31/92
Nuclear Review Board
River Bend Nuclear Station

EA-CA-92-0007-M
Page 2 of 17
RBS CYCLE 5 COLR
Rev. 0

LIST OF EFFECTIVE PAGES

Page(s)	Revision
1-17	0

INTRODUCTION AND SUMMARY

This report provides the values of the AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) limits, the core flow dependent MINIMUM CRITICAL POWER RATIO (MCPR) limits, $MCPR_f$, the thermal power dependent MCPR limits $MCPR_p$, the LINEAR HEAT GENERATION RATE (LHGR) limits, and the REACTOR PROTECTION SYSTEM (RPS) response time for APRM thermal time constant for River Bend Station, Cycle 5 as required by Technical Specification 6.9.3.1. Per Technical Specifications 6.9.3.2 and 6.9.3.3, these values have been determined using NRC-approved methodology and are established such that all applicable limits of the plant safety analysis are met.

TECHNICAL SPECIFICATION 3.2.1

POWER DISTRIBUTION LIMITS

AVERAGE PLANAR LINEAR HEAT GENERATION RATE

The limiting APLHGR value for the most limiting lattice (excluding natural uranium) of each fuel type as a function of AVERAGE PLANAR EXPOSURE is given in Figures 1, 2, 3, 4, 5, and 6. These values were determined with the SAFE/REFLOOD LOCA methodology described in GESTAR-II (Reference 1). Core location by fuel type is provided in Figure 9, which is taken from Reference 3. These figures are used if alternate calculations are required. The limits of these figures shall be reduced to a value of 0.84 times the two recirculation loop operation limit when in single loop operation (Reference 4).

TECHNICAL SPECIFICATION 3.2.3

POWER DISTRIBUTION LIMITS

MINIMUM CRITICAL POWER RATIO

The MCPR limits for use in Technical Specification 3.2.3 for $MCPR_f$ and $MCPR_c$ are shown in Figures 7 and 8. These values were determined with the GEMINI methodology and GEXL-PLUS critical power ratio correlation described in GESTAR-II (Reference 1) and are consistent with a Safety Limit MCPR of 1.07.

TECHNICAL SPECIFICATION 3.2.4

POWER DISTRIBUTION LIMITS

LINEAR HEAT GENERATION RATE

The LHGR limits for use in Technical Specification 3.2.4 are 14.4 kw/ft for GE8x8EB fuel and 13.4 kw/ft for all other fuel types. The GE8x8EB fuel consists of fuel types GE8B-P8SQB322-8GZ-120M-4WR-150-T, GE8B-P8SQB322-9GZ-120M-4WR-150-T, GE8B-P8SQB333-10GZ-120M-4WR-150-T, GE8B-P3SQB331-11GZ-120M-4WR-150-T and GE8B-P8SQB334-10GZ-120M-4WR-150-T. Core location by fuel type is provided in Figure 9.

The higher limit for GE8x8EB fuel is proprietary to GE and does not appear in Reference 1. The NRC SER on the GE8B design (Reference 2) recognizes the change to the LHGR limit, and the proprietary value is found in References 18 and 19 of Reference 2.

TECHNICAL SPECIFICATION TABLES 3.3.1-2 and 4.3.1.1-1

The simulated thermal power time constant for use in Technical Specification Table 3.3.1-2, Footnote ** is:

6 ± 0.6 seconds.

The maximum simulated thermal power time constant for use in Technical Specification surveillance Table 4.3.1.1-1 is:

6.6 seconds

REFERENCES

- 1) NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," (latest approved version).
- 2) Letter, C.O. Thomas to J.S. Charnley, "Acceptance for Referencing of Licensing Topical Report," NEDE-24011-P-A-6, Amendment 10, General Electric Standard Application for Reload Fuel, May 28, 1985.
- 3) Document 23A7181, Revision 0, "Supplemental Reload Licensing Report for River Bend Station Reload 4, Cycle 5," August 1992.
- 4) "Single-Loop Operation Analysis for River Bend Station, Unit 1," NEDO-31441, May 1987.

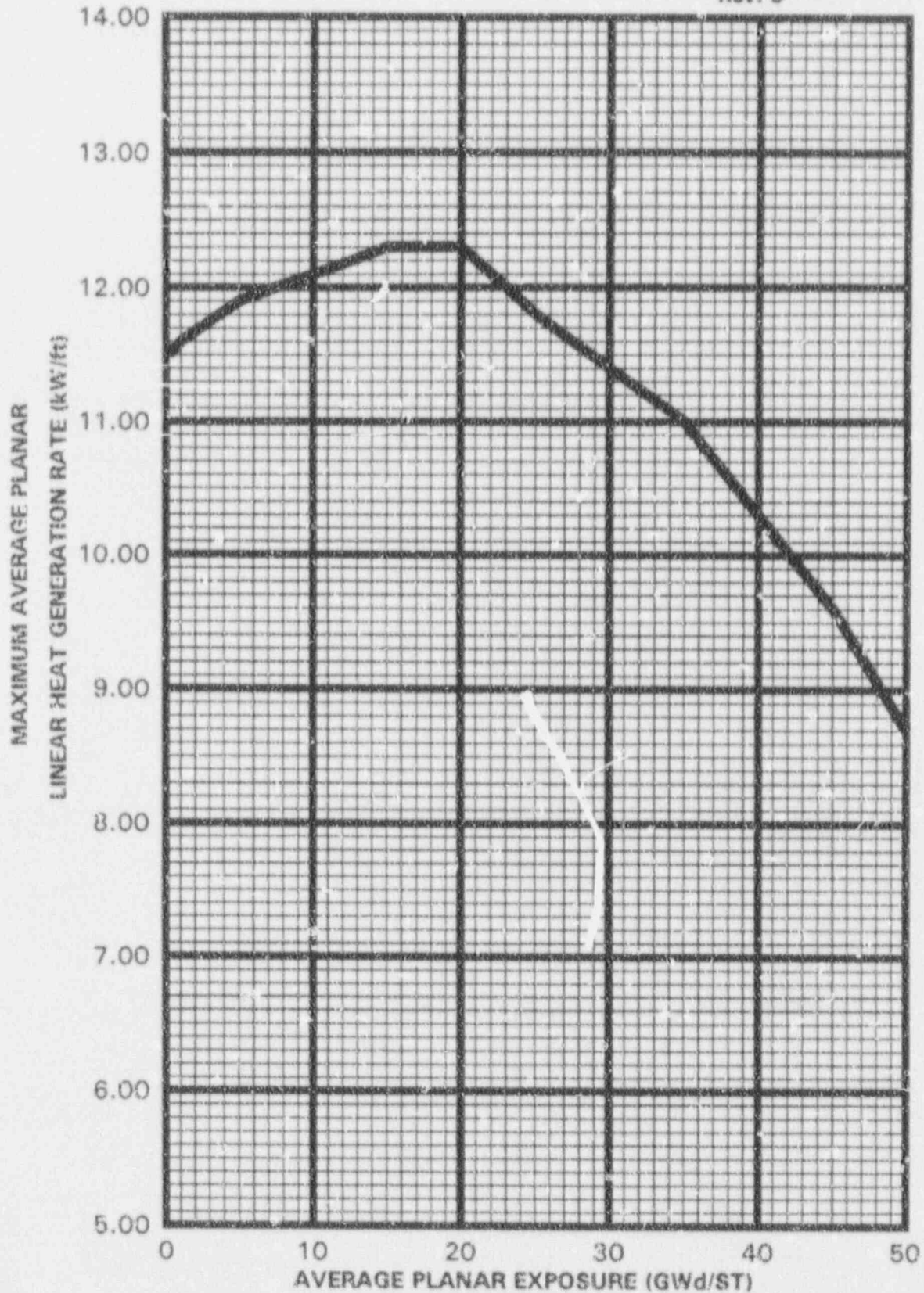


FIGURE 1
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE BP3SRB299

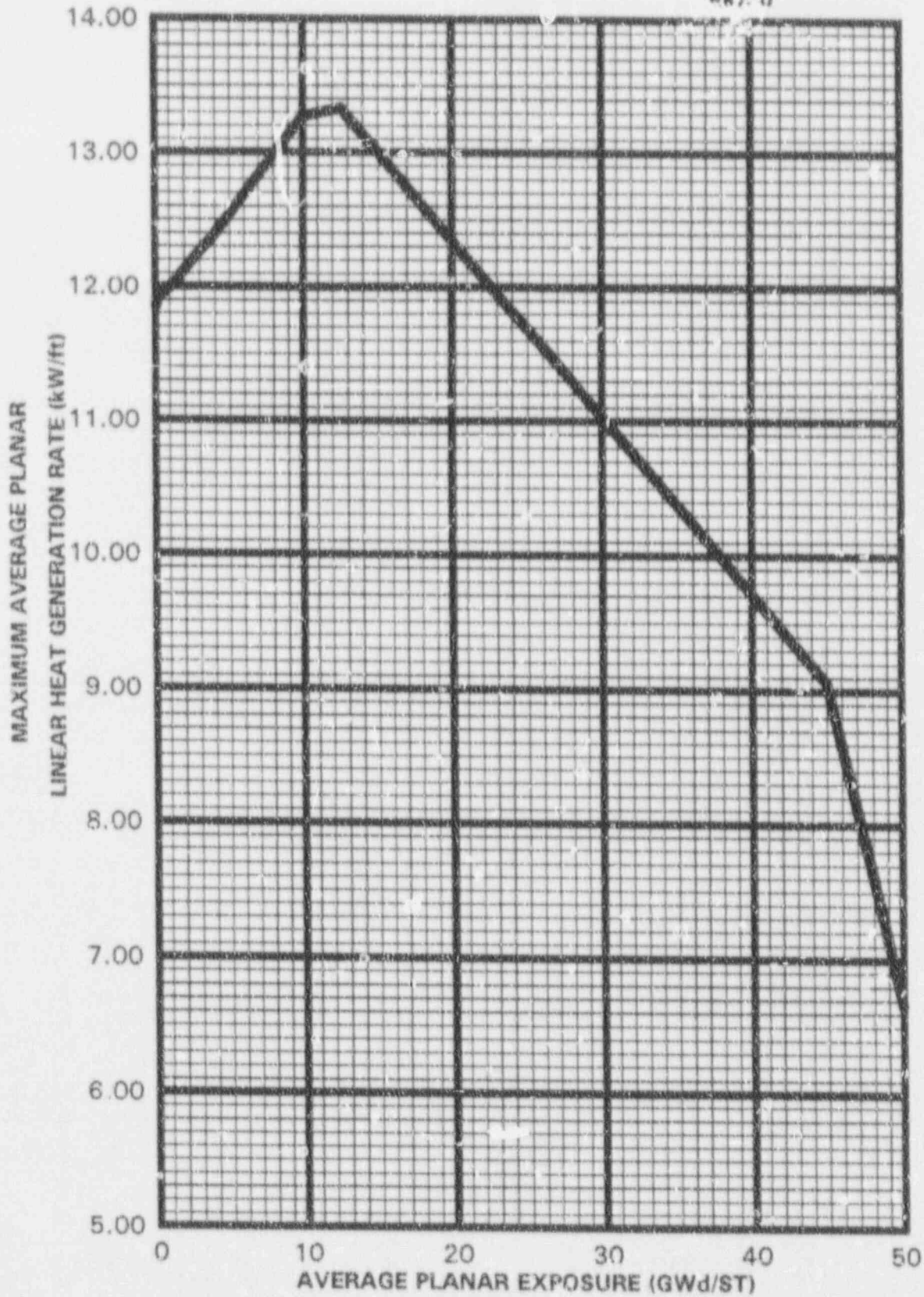


FIGURE 2
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE GE8P-P8SQB322-8GZ-120M-4WR-150-T

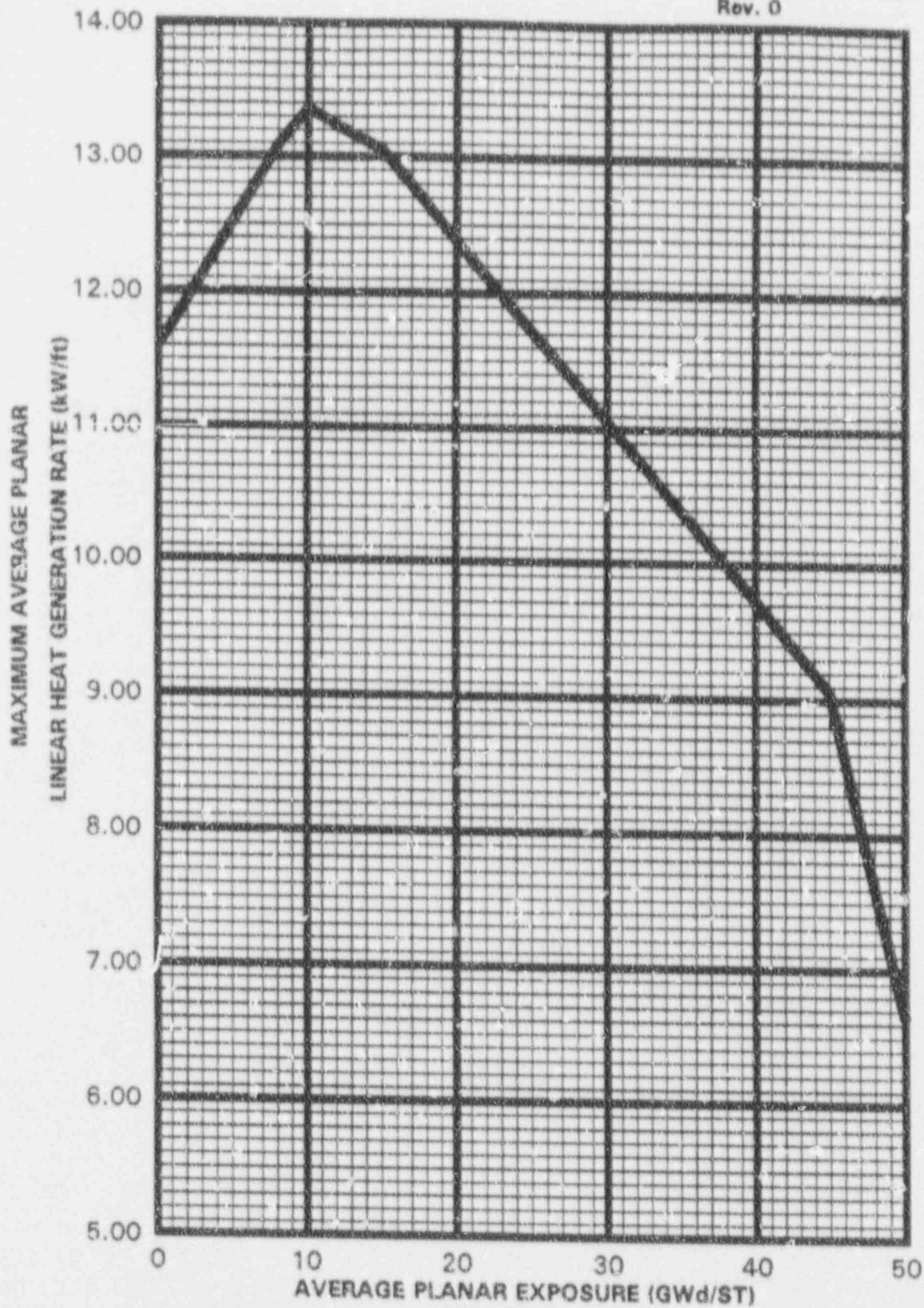


FIGURE 3
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE GE8B-P8SQB322-9GZ-120M-4WR-150-T

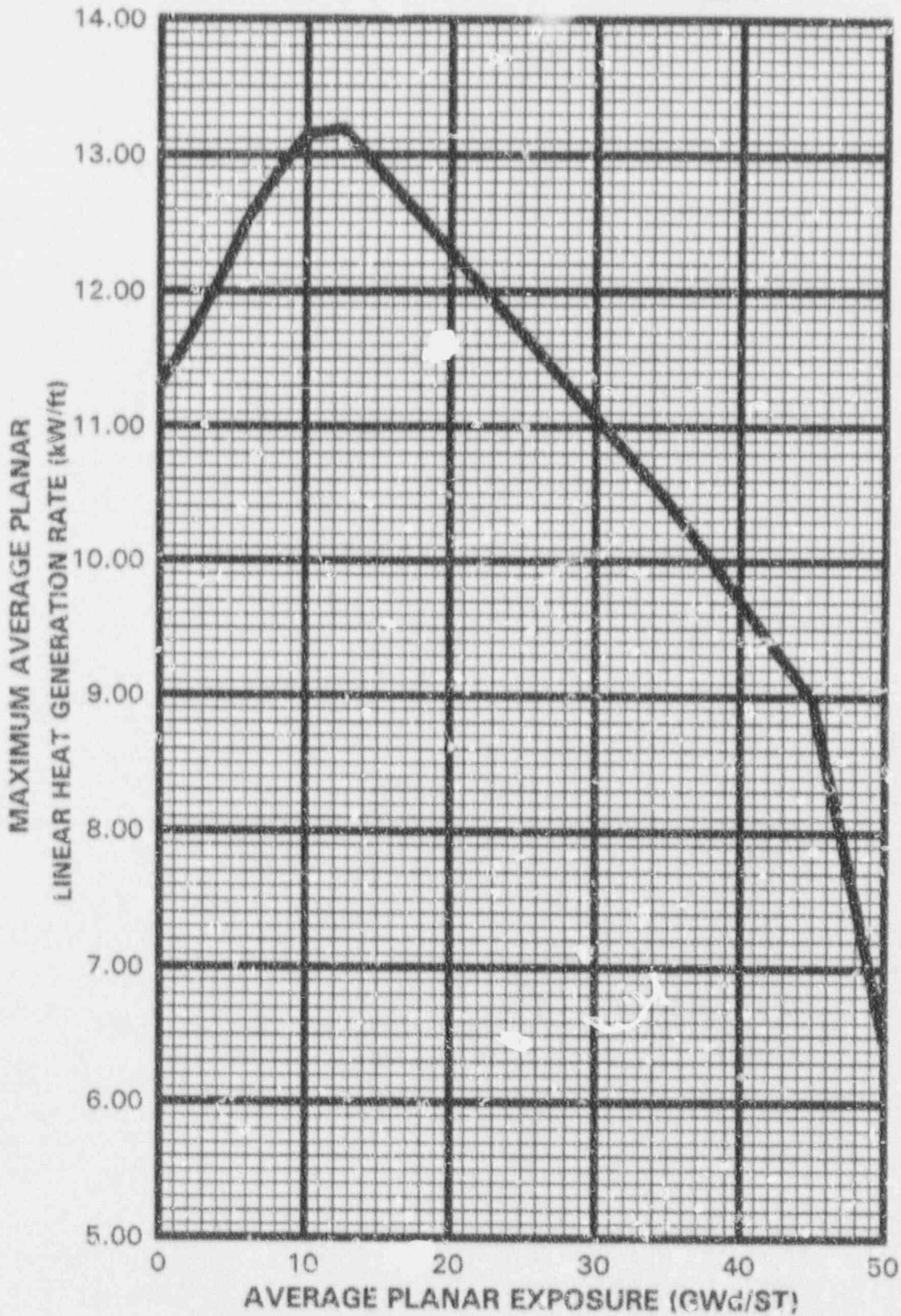


FIGURE 4
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE GE8B-P8SQBS33-10GZ-120M-0WR-150-T

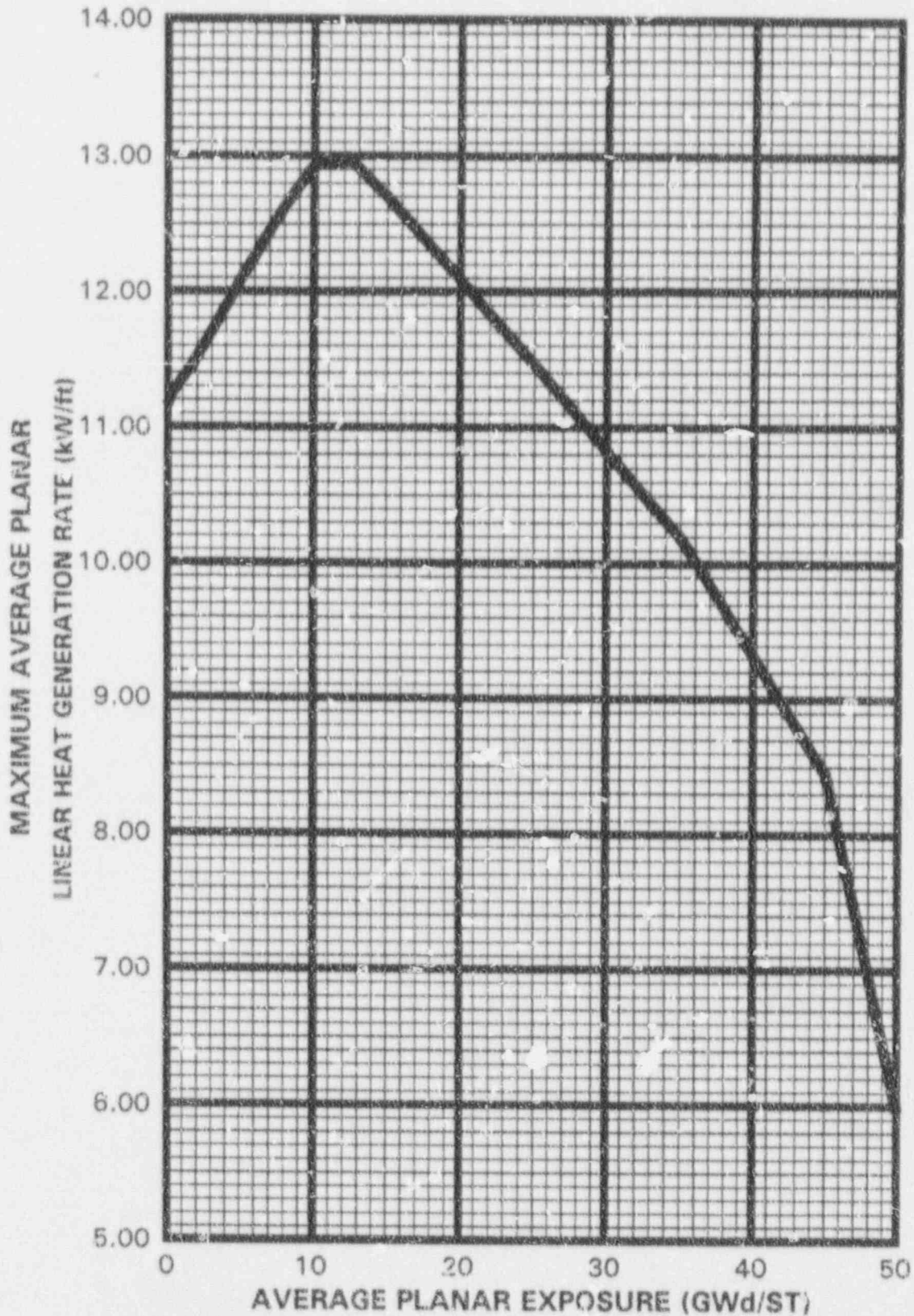


FIGURE 5
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE GE8B-P8SQB331-11GZ-120M-4WR-150-T

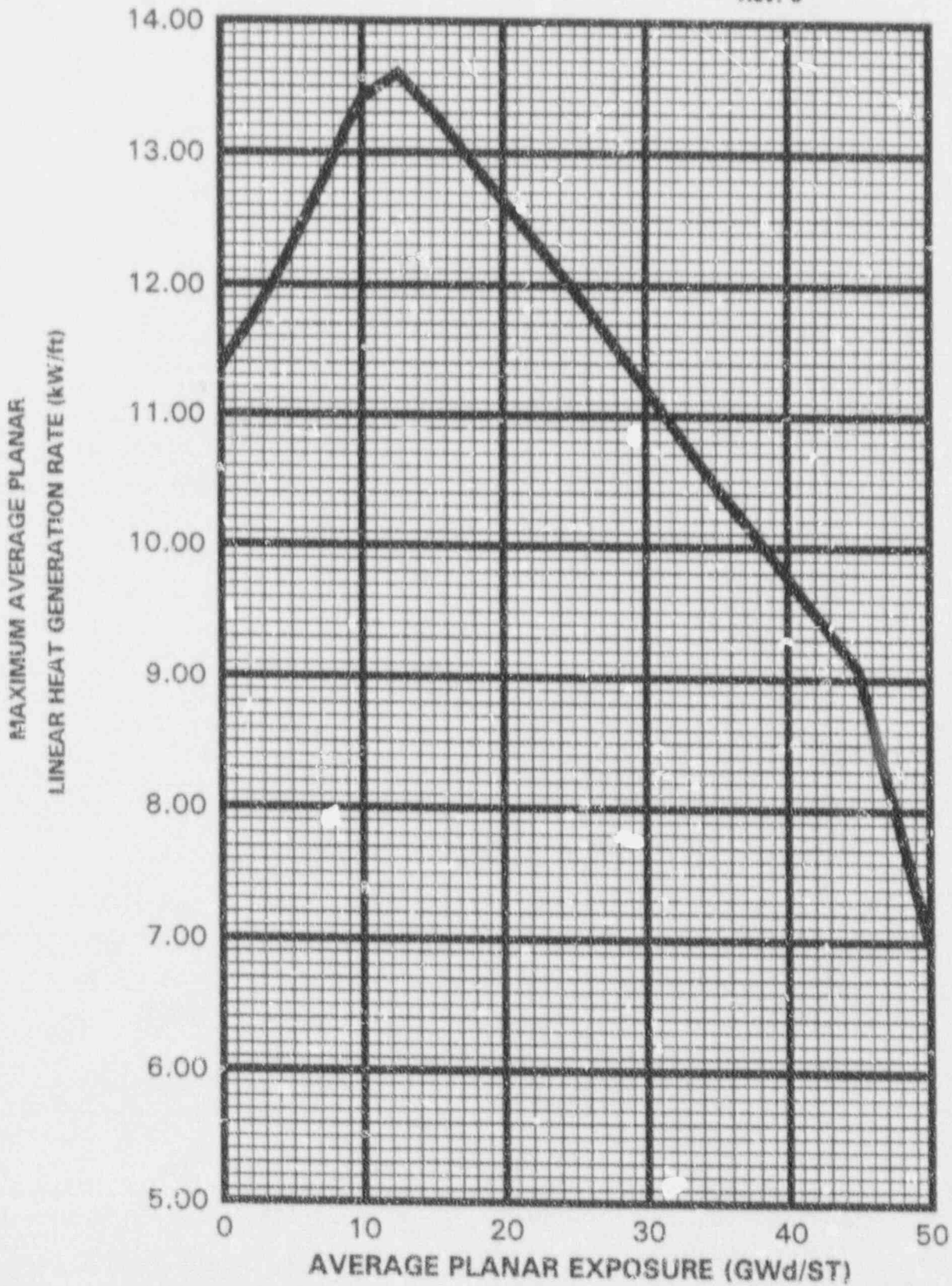


FIGURE 6
MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR)
VERSUS AVERAGE PLANAR EXPOSURE GE8B-P8SQB334-10GZ-120M-4WR-150-T

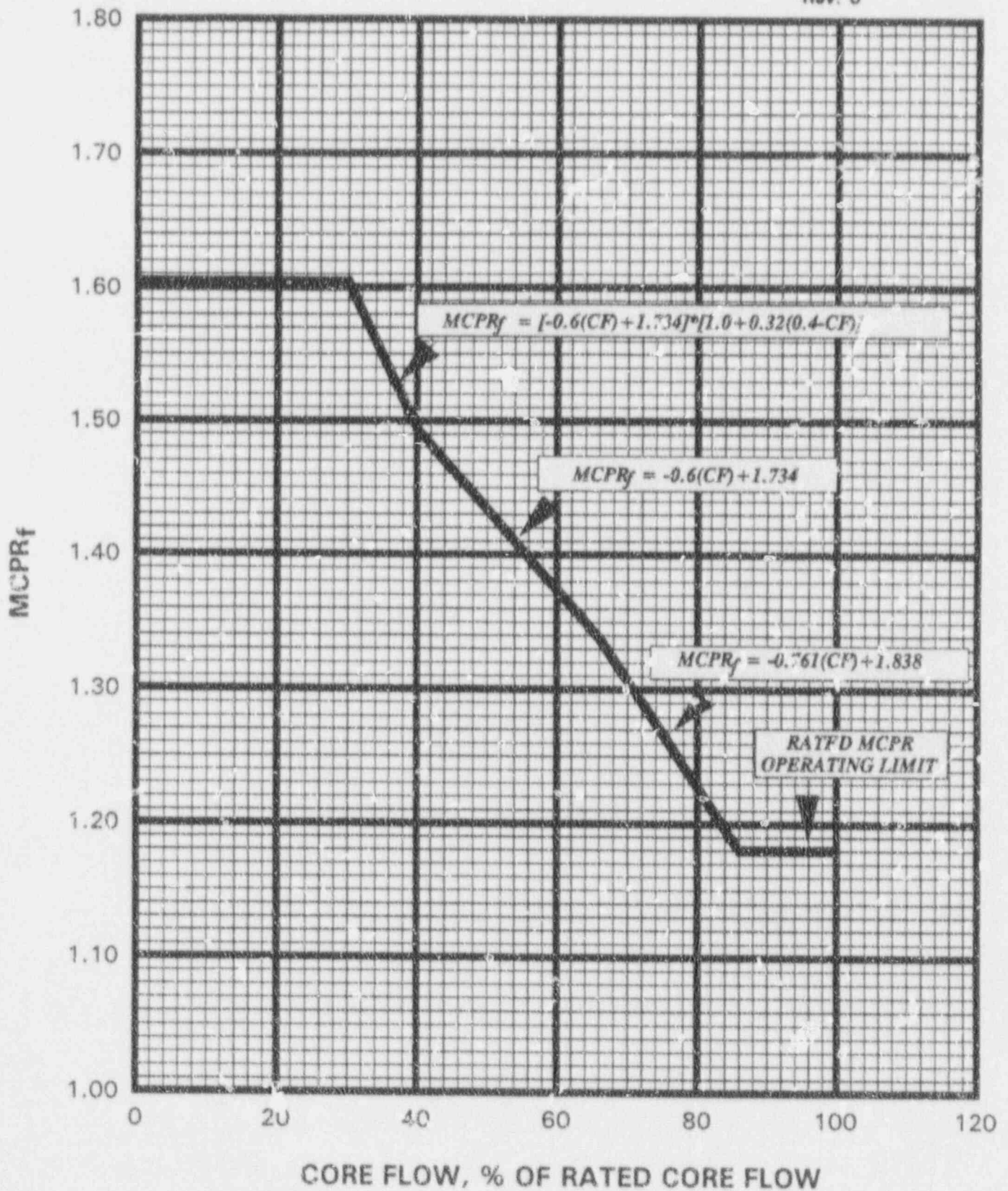


FIGURE 7
MCPR_f

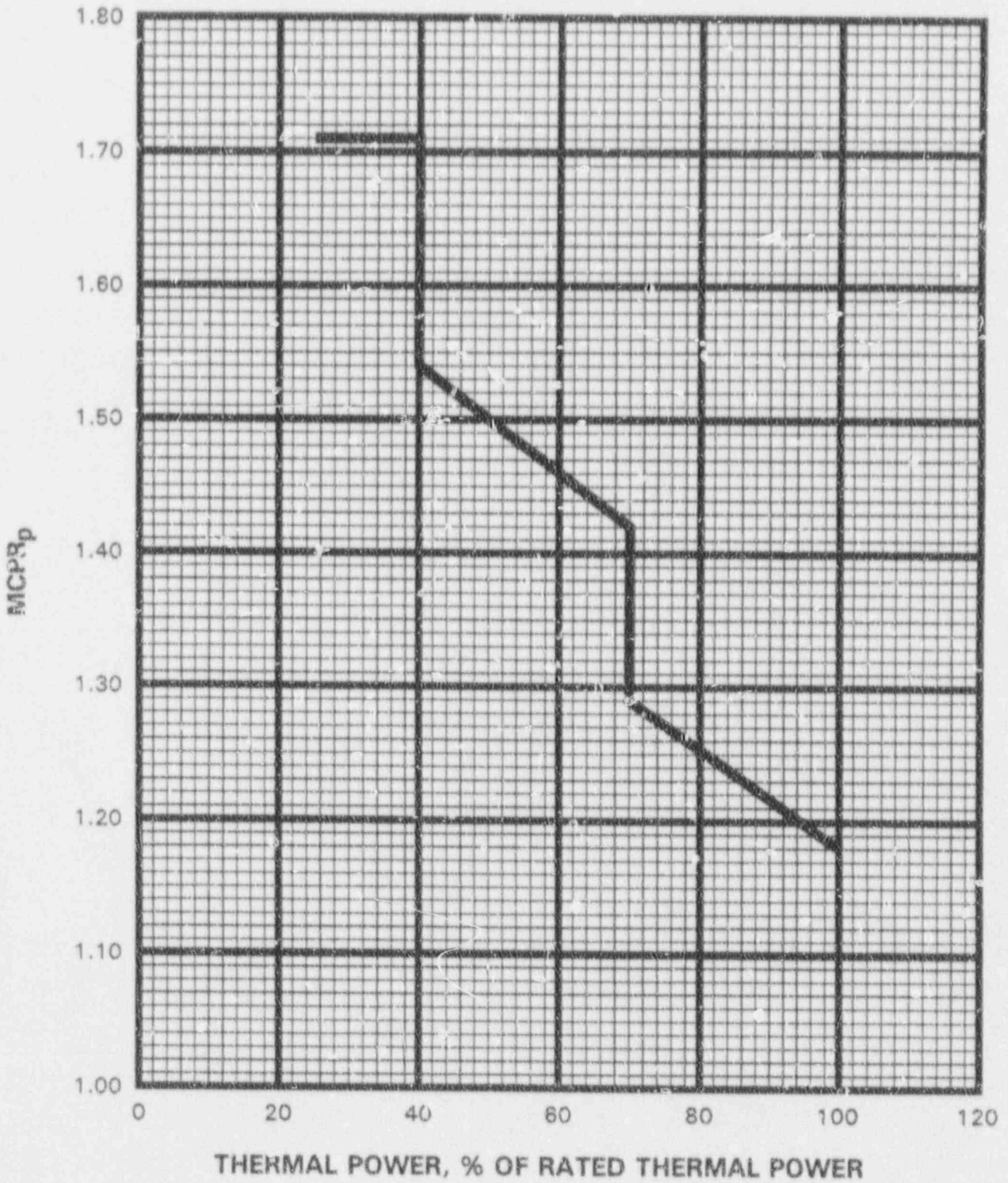
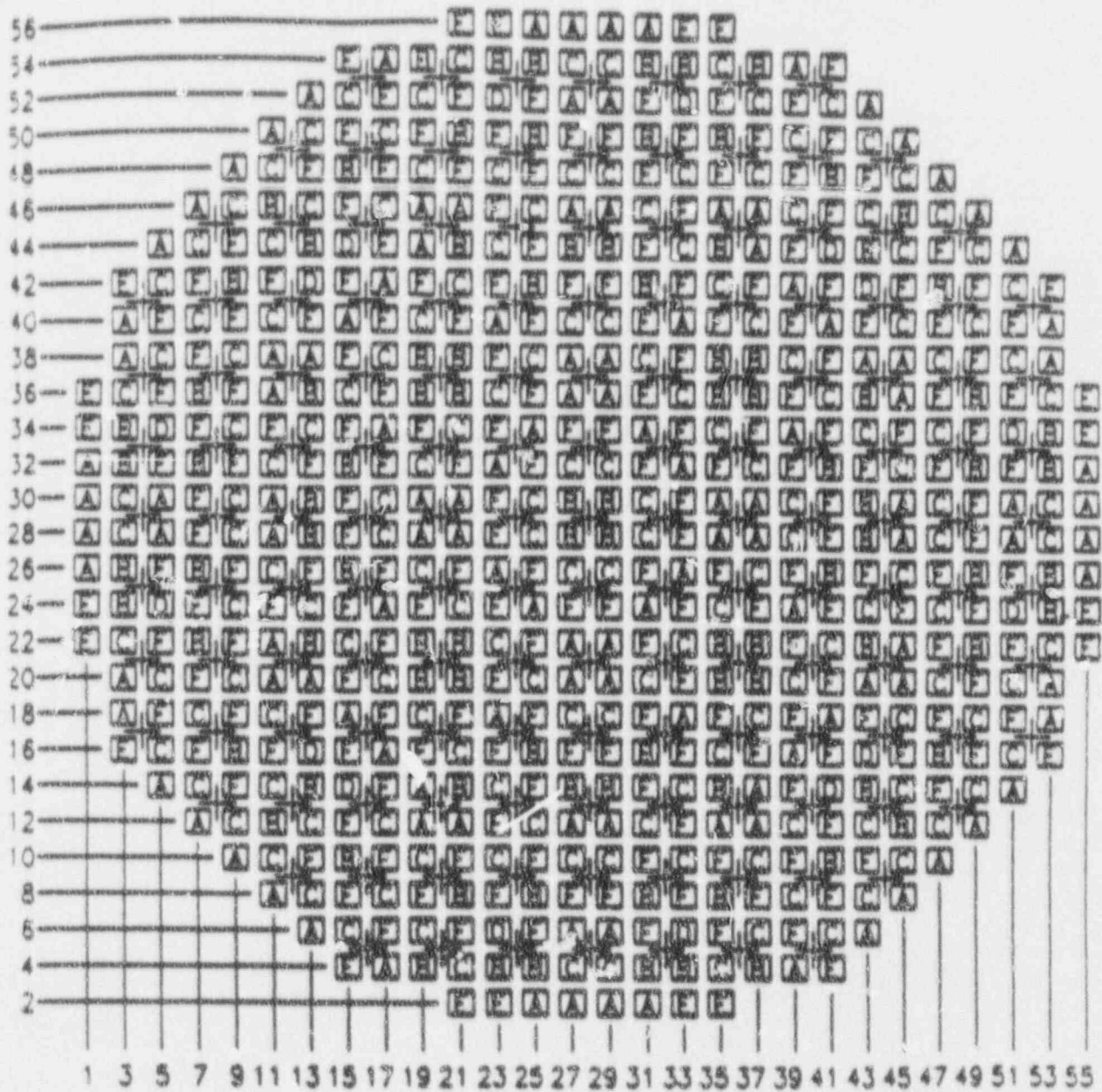


FIGURE 8
MCPR_p



FUEL TYPE	
A=GE88-P85Q8322-8GZ-120M-4WR-150-T	D=GE88-P85Q8331-11GZ-120M-4WR-150-T
B=GE88-P85Q8322-9GZ-120M-4WR-150-T	E=BP85R8299
C=GE88-P85Q8333-10GZ-120M-4WR-150-T	F=GE88-P85Q8334-10GZ-120M-4WR-150-T

Figure 9. Reference Core Loading Pattern